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NOTES AND QUERIES.

Professor De Morgan favours us with the following problem, and, as will be observed, invites solutions of it:—

For abbreviation, let $(1+r)^n$ be represented by $1+1_n r+2_n r^2+3_n r^3+\ldots$

The fractions whose numerators are $(1+r)^n-1$, $(1+r)^n-1-1_n r$, $(1+r)^n-1-1_n r-2_n r^2$, $(1+r)^n-1-1_n r-2_n r^2-3_n r^3$, &c., and whose denominators are r, r^2, r^3, r^4, &c., represent the accumulations of the annuities 1, 1, 1, &c. for n years; 1, 2, 3, &c. for $n-1$ years; 1, 3, 6, &c. for $n-2$ years; 1, 4, 10, &c. for $n-3$ years; &c.

Required a proof; *the calculus of differences and all summation of series involving powers being excluded.*

CORRESPONDENCE.

THE INTEREST QUESTION.

To the Editor of the Assurance Magazine.

Sir,—In your last Number* of the *Assurance Magazine*, "A Young Associate," who seems to be inspired with the doctrines of *a well known writer*, has attempted to defend the theory of the latter—first, by pointing out to me the solution to the problem specified at the conclusion of my letter in No. XII. of your *Magazine;* and, secondly, by directing my attention to the work of Mr. Rouse, who, like myself, in the opinion of the writer, erred in assuming the geometrical mean of $(1+d)^{\frac{1}{2}}$ between 1 and $(1+d)$, instead of the arithmetical mean of $\left(1+\frac{d}{2}\right)$, *as in common use.*

I venture to suppose that, like myself, all truly mathematical readers will consider that in cases of compound interest, which forms a strictly *geometrical* series, the upholding an arithmetical mean against a geometrical mean is in itself *mean* indeed, and *means* nothing; as will be demonstrated presently. Moreover, to cite *common use* in a question of a purely mathematical character, is really absurd, and no *common* sense!

Mr. Farren, in No. XI. of your periodical, inserted a paper wholly directed against Simpson and Dodson, for having imagined that De Moivre assigned $1-i\text{A}$ as the present value of £1 payable at the end of the year of death, and for having accordingly adopted that value. Mr. Farren states, that "there are reasons (?) for imagining that, in *one case at least*,† this celebrated analyst fell into no such error, but correctly (?) assigned $1-i\text{A}$ as the present value of £1 due at the *beginning* of the year of death,

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* This communication was intended for the January Number, but was received too late for insertion in it.—Ed. *A. M.*

† I suppose that by the indefinite expression "*one case at least*," Mr. Farren meant *this case*, the one at issue; but preferred saying *one*, as an indication that on all other subjects De Moivre *did* fall into error—an inference which, however, must be made with caution.